

IOWA STATE UNIVERSITY

Digital Repository

Retrospective Theses and Dissertations


Iowa State University Capstones, Theses and
Dissertations

2008

An exploratory study of computer assisted language learning (CALL) glosses and traditional glosses on incidental vocabulary learning and Spanish literature reading comprehension

Thomas Michael Lage
Iowa State University

Follow this and additional works at: <https://lib.dr.iastate.edu/rtd>

 Part of the [Bilingual, Multilingual, and Multicultural Education Commons](#), [Instructional Media Design Commons](#), [Linguistics Commons](#), and the [Online and Distance Education Commons](#)

Recommended Citation

Lage, Thomas Michael, "An exploratory study of computer assisted language learning (CALL) glosses and traditional glosses on incidental vocabulary learning and Spanish literature reading comprehension" (2008). *Retrospective Theses and Dissertations*. 15393.
<https://lib.dr.iastate.edu/rtd/15393>

This Thesis is brought to you for free and open access by the Iowa State University Capstones, Theses and Dissertations at Iowa State University Digital Repository. It has been accepted for inclusion in Retrospective Theses and Dissertations by an authorized administrator of Iowa State University Digital Repository. For more information, please contact digirep@iastate.edu.

An exploratory study of computer assisted language learning (CALL) glosses and
traditional glosses on incidental vocabulary learning and Spanish literature reading
comprehension

by

Thomas Michael Lage

A thesis submitted to the graduate faculty
in partial fulfillment of the requirements for the degree of
MASTER OF ARTS

Major: Teaching English as a Second Language/ Applied Linguistics (Computer
Assisted Language Learning)

Program of Study Committee:
Volker Hegelheimer, Major Professor
Carol A. Chapelle
Dawn Bratsch-Prince
Cristina Pardo Ballester

Iowa State University

Ames, Iowa

2008

Copyright © Thomas Michael Lage, 2008. All rights reserved.

UMI Number: 1454699

INFORMATION TO USERS

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleed-through, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.



UMI Microform 1454699
Copyright 2008 by ProQuest LLC
All rights reserved. This microform edition is protected against
unauthorized copying under Title 17, United States Code.

ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106-1346

TABLE OF CONTENTS

LIST OF FIGURES	iv
LIST OF TABLES	v
ABSTRACT	vi
CHAPTER 1. OVERVIEW	1
1.1 Introduction.....	1
1.2 Defining Incidental Learning in the Context of Vocabulary	1
1.3 Learner Characteristics	2
1.4 Pilot Study.....	3
1.5 Research Questions.....	3
1.6 Organization of the Study	4
CHAPTER 2. REVIEW OF LITERATURE	6
2.1 The Potential of Computer Technology in Language Learning	6
2.2 The Psychology of Multimedia Learning	7
2.3 A Further Discussion of Incidental Vocabulary Learning	9
2.4 Measuring Incidental Vocabulary Learning	11
2.5 Measuring Reading Comprehension.....	12
2.6 Increasing the Likelihood of Incidental Vocabulary Learning.....	13
2.7 The Provision of Additional Semantic Input When Reading for Comprehension	14
2.7.1 Audio, Text, Video With Text, and Image Glosses	15
2.7.2 L1 versus L2 Glosses	17
2.7.3 Dictionaries	18
2.7.4 Marginal Glosses	19
2.7.5 Paper Versus Computer	20
2.8 Discussion	21
CHAPTER 3. METHODOLOGY	23
3.1 Participants.....	23
3.1.1 CALL Group	24
3.1.2 Traditional Group.....	25
3.2 Materials	25
3.2.1 Reading Passage.....	25
3.2.2 Target Words	26
3.2.3 CALL Group Presentation of the Text.....	27
3.2.4 Traditional Group Presentation of the Text	29
3.2.5 Data Gathering Materials	30
3.2.5.1 Pre-test	30
3.2.5.2 Reading comprehension test	30
3.2.5.3 Vocabulary post-tests.....	30
3.2.5.4 Questionnaire	31
3.3 Analysis of the CALL and Traditional Activity	31
3.3.1 Language learning potential.....	32
3.3.2 Learner fit.....	32
3.3.3 Meaning focus.....	33

3.3.4	Authenticity.....	33
3.3.5	Impact	34
3.3.6	Practicality	34
3.4	Procedure	35
3.4.1	Day one	36
3.4.1.1	Learner training.....	36
3.4.1.2	CALL group.....	37
3.4.1.3	Traditional group	37
3.4.2	Day two	38
3.4.3	The following weeks.....	38
3.5	Compilation of Gloss Access Type and Frequency.....	38
3.6	Rating the Assessments	39
3.7	Analysis	40
3.7.1	Research question one.....	41
3.7.2	Research question two	41
3.7.3	Research question three	41
3.7.4	Research question four.....	42
CHAPTER 4.	RESULTS	43
4.1	Research Question One.....	43
4.2	Research Question Two	44
4.3	Research Question Three	45
4.4	Research Question Four	47
4.5	Feedback from the Questionnaire	48
4.6	Discussion.....	49
CHAPTER 5.	SUMMARY AND DISCUSSION	50
5.1	Limitations	50
5.2	Pedagogical Implications	51
5.3	Further Research	53
APPENDIX A.	BRIEF SUMMARY OF THE TARGET TEXT	55
APPENDIX B:	INFORMED CONSENT DOCUMENT	56
APPENDIX C.	PRE-TEST	59
APPENDIX D.	READING COMPREHENSION TEST	61
APPENDIX E.	VOCABULARY POST-TESTS.....	63
APPENDIX F.	QUESTIONNAIRE	68
APPENDIX G.	KEYS	70
APPENDIX H.	RATING SCALES	73
REFERENCES	75
ACKNOWLEDGEMENTS	78

LIST OF FIGURES

<i>Figure 1: Continuum of intentional and incidental vocabulary learning.....</i>	<i>14</i>
<i>Figure 2: CALL text and gloss presentation.....</i>	<i>28</i>
<i>Figure 3: Traditional text and gloss presentation</i>	<i>29</i>
<i>Figure 4 Illustration of t-tests conducted in answering research question three</i>	<i>46</i>

LIST OF TABLES

<i>Table 1: Demographic data of the CALL group and Traditional group (means)</i>	<i>24</i>
<i>Table 2: The 17 target words and their part of speech.....</i>	<i>27</i>
<i>Table 3: Inter-rater reliabilities among the three raters of the assessments.....</i>	<i>40</i>
<i>Table 4: Identification of the independent and dependent variables, and data gathered from procedure.....</i>	<i>40</i>
<i>Table 5: Descriptive statistics of total gloss access by group</i>	<i>44</i>
<i>Table 6: Descriptive statistics of reading comprehension scores by group</i>	<i>44</i>
<i>Table 7: Descriptive statistics for vocabulary test scores by group</i>	<i>45</i>
<i>Table 8: Results of the paired sample t-tests (significance level = .05)</i>	<i>47</i>
<i>Table 9: Descriptive statistics for combined group learner characteristics</i>	<i>48</i>
<i>Table 10: Spearman correlations of non-language influences and access frequency.....</i>	<i>48</i>

ABSTRACT

The following is an exploratory study investigating the difference in the incidental vocabulary learning (or recall) of Spanish vocabulary while reading for comprehension. A secondary area of investigation is the influence of learner characteristics on gloss access. High-intermediate/low-advanced Spanish students from two sections of the same Spanish course at an American university participated in this study. One group of participants was provided traditional English marginal glosses to the left of the reading while the second group of students was provided with computer-assisted language learning (CALL) glosses. The participants took three constructed response vocabulary post-tests in the following three weeks and a constructed response reading comprehension test upon completion of the reading task. The results were ultimately inconclusive, but indicated that there was no significant difference between word recall and gloss presentation, and that gloss access is to some extent positively related to language proficiency.

CHAPTER 1. OVERVIEW

The opening chapter of this study defines the term *incidental learning*, describes the pilot study conducted to test the time requirement needed for the computer-assisted language learning (CALL) portion of the main study, and presents the research questions to be explored in the study. Finally, the organization of the rest of the study is included.

1.1 Introduction

This is an exploratory study that contrasts the incidental vocabulary learning of two groups of high-intermediate/low-advanced Spanish literature students while engaged in a reading activity. The study investigates how learners using a CALL program and a similarly designed traditional approach differ in *incidental vocabulary learning* by the comparing the number of words retained after three weeks. Additionally, the study investigates whether a relationship between non-language characteristics and gloss access exists.

1.2 Defining Incidental Learning in the Context of Vocabulary

The investigation of the effects of glosses and the additional information they provide has become a theme of great interest for many researchers, especially with the availability of multimedia and computers in the language learning classroom. *Incidental vocabulary learning* has been of special interest because as Huckin & Coady (1999) emphasized, incidental vocabulary learning is preferred to intentional learning: (a) it is individualized; (b) it occurs in a contextualized form giving learners a sense of the use of

the words in real situations; (c) it is more permanent; and (d) it enables vocabulary acquisition and reading to occur simultaneously. These advantages lead researchers to investigate the efficiency and the outcomes of providing language learners with additional semantic input for second language (L2) vocabulary while engaged in a reading activity.

For the present study, *incidental vocabulary learning* is defined as those words recalled after learners are engaged in a reading task. This definition is based on the discussion of Gass (1999) which explains that although many definitions of *incidental vocabulary learning* exist, the notion that learning vocabulary becomes ancillary to the main pedagogical activity is constant. That is, any vocabulary learning that occurs that is not related to the purpose of a given language activity can be called *incidental*. Gass (1999) also stresses that incidental vocabulary learning does not mean that the learner does not notice the word in question; only that his or her attention is focused on comprehending the reading passage as a whole, and memory of the new word comes as a natural result of this process. Therefore, this means a conscious effort to learn is unnecessary. Finally, Gass points out that *incidental learning* differs from *implicit learning* because the latter is essentially a behaviorist notion in which the acquisition of the meaning of a new word is acquired as a result of repeated exposures in a range of activated contexts.

1.3 Learner Characteristics

Learner characteristics have been studied throughout second language acquisition (SLA) research because one of the most widely recognized facts about SLA is that some

individuals are better at learning languages than others (Gass & Selinker, 2001). Learner motivation and personality factors such as extroversion and introversion are investigated in SLA research in order to better understand the language learner and create a better environment for language learning. The present study will investigate how motivation, extroversion, introversion, and language proficiency are related to gloss access frequency.

1.4 Pilot Study

Following Institutional Review Board (IRB) approval, a pilot study of the CALL version of the study was conducted in order to investigate the time needed for completion of the first day of the study. The participants took a vocabulary pre-test, read the text, took a reading comprehension test, a vocabulary post-test, and a survey. The pilot study was conducted with five native speakers (NS) of Spanish and two non-native speakers (NNS) of Spanish and had a total duration of two hours. This time commitment proved too long for the intended participants of the study; therefore, the researcher decided to split the first day of the study into two separate meetings, one day lasting a total of 50 minutes, and the second meeting lasting a total of 15 minutes.

1.5 Research Questions

The main purpose of the present study is to investigate the effect of gloss access frequency on incidental vocabulary learning and to investigate whether a group of students provided with the traditional approach of English-only glosses or a group presented with a selection of audio, image, English (L1), or Spanish (L2) glosses shows

evidence of higher incidental vocabulary learning. Nation (2001) extensively defined what it means to “know a word”; however, in the present study, knowing a word is defined as recognizing the target word in Spanish and being able to recall either the word translation in English or being able to produce an English definition of the term. Nation would classify this knowledge as the receptive and productive knowledge required for knowing the form and meaning of a word (p. 26). A secondary purpose of this study is to explore whether particular self-reported learner variables correlate with gloss access frequency. The research questions for the present study are as follows:

- 1) To what extent do Spanish students use glosses when reading Spanish literature in a CALL environment and traditional environment?
- 2) Which type of gloss presentation, traditional or CALL, facilitates reading comprehension the most?
- 3) To what extent do the type of gloss presentation, CALL or traditional have an affect on incidental vocabulary learning at post-test one? What is the effect over a period of three weeks?
- 4) Are lookup frequencies related to student reported introversion, extroversion, motivation, and language proficiency?

1.6 Organization of the Study

The remainder of this study is presented in four additional chapters. A survey of current research on this topic is presented in Chapter Two and followed by a description of the method used in Chapter Three. Chapter Four presents the results of the study and answers to the research questions presented in Chapter One and relate these findings with

those discussed in Chapter Two. Finally, Chapter Five posits any pedagogical implications that may be deduced from the findings and suggests ideas to further research in this area.

CHAPTER 2. REVIEW OF LITERATURE

This chapter is dedicated to the summation of studies associated with incidental vocabulary learning, multimedia learning, and glosses. There is much literature associated with this topic and an analysis accompanies the summation.

2.1 The Potential of Computer Technology in Language Learning

The use of computers in language learning is a phenomenon that has taken the Applied Linguistics field by storm and the application of computers in language learning tasks is becoming more and more common. Since the introduction of computers in foreign/second language instruction, researchers and theorists have agreed that computer technology possesses great potential for language learning (Bax, 2003; Levy, 1997; Muyskens, 1997; Pennington, 1996; Warschauer, 1996; Warschauer & Healey, 1998). Even though the field of CALL is relatively young, it is approached with great enthusiasm by language researchers and instructors endorsing the use of computer technology and its potential to extend language teaching within and outside the classroom.

One of the most fascinating features of technology in language learning is the ability for the computer to interact with its user, provide additional input or feedback, and its use as a tool to connect language learners with others, often instantaneously. Computer-mediated communication (CMC) has allowed computer users to be able to connect and communicate, via the Internet or local area networks (LANs), with

individuals around the globe (Braine, 2004; De la Fuente, 2003). Additionally, email correspondence has been the subject of studies focusing on particular aspects of language development such as the “da compound” in German (Belz, 2004). Case studies have even been conducted to investigate whether the Internet and the ability to create web pages can help L2 learners develop their own identities and improve their L2 confidence (Lam, 2000). These studies clearly demonstrate the potential of computer technology for language learning and the positive benefits associated with using computers as a language tool.

The use of glosses seems, at face value, to be beneficial to learners when they are engaged in a reading activity. These glosses provide learners with additional semantic input for lexical items a researcher or instructor believes a learner will have difficulty understanding. These glosses also provide learners opportunities for meaningful learning by using different systems of the brain. Taylor (2006) commented that from an interactive reading standpoint, top-down strategies such as activating background knowledge and noticing text structure are important but are often dependent on lexical knowledge (Eskey, 1988). He then points out that glossing is essentially bottom-up lexical process and therefore helps in providing direct support for L2 vocabulary acquisition. However, the question of whether one type of gloss is more effective than other types is still debatable.

2.2 The Psychology of Multimedia Learning

Much of the support for glossing, especially input including multimedia such as images, video, and audio, comes from psychology. In his study, Akbulut (2007) presents

three theories (Chandler & Sweller, 1991; Mayer, 1997; Paivio, 1986) each of which posit how information is represented in the mind when learning. *Dual coding theory* (Paivio, 1986) suggests that image and verbal information exist in the mind in two separate mental subsystems that complement each other facilitating information retention. One subsystem specializes in dealing with language and the other deals with the processing and representation of non-verbal objects. Paivio calls the subsystem dealing with language-specific representations (writing patterns, visual, and auditory words) *the verbal system*. The subsystem functioning in the analysis of scenes and generation of mental images is called *the imagery system*. In the language classroom therefore, this theory posits that learning is facilitated and made more meaningful when materials involve the imagery system and the verbal system simultaneously.

Cognitive Load Theory (Chandler & Sweller, 1991) posits that the visual and verbal working memories processing capabilities of an individual are severely limited. This is unlike the long-term memory. Therefore, it is suggested that presenting too many elements to be processed by the visual and verbal working memories may cause a cognitive overload. In other words, less may actually be more when learning: several instruction messages should be coded as a single element in order to reduce the chance of overloading the cognitive system of a learner.

Finally, Mayer (1997) integrates these prior theories into his *Generative Theory* of multimedia learning and provides a framework for instructional presentations. Depending on the type of input, he proposes that meaningful learning is more like likely to occur when input and images about relevant words are stored in either the auditory/verbal or the visual/pictorial channel of the mind. Organizing this information,

learners will integrate verbal and visual representation separately and these representations into an already existing mental representation (i.e., schemata). Therefore, this suggests that the presentation of words and pictures simultaneously and eliminating extraneous media modes lead to better learning outcomes and a more meaningful learning experience.

Considering how information is stored in the mind, it seems feasible that instructors would want to design reading activities that utilize glosses or other input enhancements to provide for the best learning experience possible.

2.3 A Further Discussion of Incidental Vocabulary Learning

In Chapter One, a definition of incidental vocabulary learning and its connection with glossing was given. However, this concept warrants further discussion. Krashen's Input Hypothesis (1982) states that exposure to input at the right level of difficulty ($i+1$) is both necessary and sufficient for L2 acquisition to take place. *Acquisition* in this sense is broadly defined as implicit learning. In other words, when presented with comprehensible and abundant input, a learner "automatically" learns. Therefore, when learners are reading a text, the Input Hypothesis suggests that instructors provide learners with a text that is believed to be challenging. In other words, the text should not be too easy nor should the text be so difficult that reading is rendered impossible. This challenge should provide the learner opportunities to process the language and develop proficiency. Additionally, in such situations it is highly likely that learners will be exposed to unfamiliar vocabulary. As Krashen implied, vocabulary that is naturally

acquired is both more persistent and more likely to be remembered than vocabulary explicitly learned through memorization or dictionary use.

Research into incidental vocabulary learning supports, in part, an investigation of the *noticing hypothesis* (Schmidt, 1990, 1993). Schmidt (1990) states what learners notice is constrained by number of factors, but incidental learning is certainly possible when the task demands focused attention on relevant features of the input. Further discussion of incidental learning is found in Huckin & Coady (1999, pp. 190-191) where the authors revisit the debate regarding incidental vocabulary learning. While trying to make sense of the “main lines of investigation” in incidental vocabulary research, they sketched out the following points that are relevant to the use of glosses in reading tasks:

- (1) Incidental learning is not entirely “incidental,” as the learner must pay at least some attention to individual words. However, the amount of attention and the amount of learning varies according to a number of factors including context, type of attention, and task demands.
- (2) Although incidental acquisition takes place incrementally over a period of time, there is no agreement as to how many and what kinds of exposures are needed for successful acquisition
- (3) Students generally benefit from explicit vocabulary instruction in conjunction with extensive reading.
- (4) Some kinds of reading texts are more conducive to incidental learning than others—in particular, texts that are personally interesting to learners.
- (5) Input modification, including glossing of specific words, is generally effective, especially if it involves the learner interactively.

Thus, it appears that tasks combining these awareness strategies and the use of glosses may create opportunities for incidental vocabulary learning when combined with reading tasks. Even though using these strategies and methods may provide opportunities for incidental vocabulary learning, the present study and the current literature can only provide evidence for “vocabulary meaning recall.” This means that participants showed evidence of being able to recall the meaning of target words (TWs), but since no further contact with the participants (beyond a couple of weeks for the delayed tests), it is difficult to determine whether the word meanings could be recalled at a later time.

2.4 Measuring Incidental Vocabulary Learning

In the current literature, when measuring incidental vocabulary learning while reading for comprehension, many studies use vocabulary pre-test and post-tests/recall protocols. When using these protocols, Laufer and Hulstijn (2001) recommend that not announcing the vocabulary post-tests induces incidental learning of vocabulary and warn that the announcement of such retention tests may cause students to focus on learning the vocabulary reducing the incidental learning of the words. Such assessments are acceptable off-line measures and are seen as providing a purer measure, uncomplicated by linguistic performance and tester interference” (Bernhardt, 1991; Myers, 1990).

However, Lomicka (1998) points out that even if a reader can answer questions or recall words, he or she may not hold a coherent understanding of the text. Some researchers believe on-line measures of comprehension (reading processes and text integration during reading), account for reading comprehension as it is occurring, may be a more accurate measure of comprehension (p. 43). As a possible alternative to the pre-

test post-test/recall protocol measurement of reading comprehension and the effect that unknown vocabulary may have on the comprehension of a text, she recommends taking measurements while students are on-line or are participating in a reading activity. Since observing mental activity is nearly impossible and must be implied, she recalled the research used in assessing comprehension in L1 reading (Trabasso & Magliano, 1996; Trabasso & Suh, 1993; Whitney & Budd, 1996; Whitney, Ritchie, & Clark, 1991).

Furthermore, Lomika mentions that think-aloud protocols may offer a different approach to the question of comprehension when reading in which students are asked to verbalize their understanding of a sentence. The combination of the think-aloud and causal inference techniques may also be able to promote awareness in students and focus their attention towards the acquisition of lexical items while reading. However, the use of think-aloud protocols offer some challenges for researchers since training participants on using these protocols effectively and correctly presents a challenge and demands a large time commitment from the participants. Therefore, current research typically follows the pre-test and post-test/recall protocols.

2.5 Measuring Reading Comprehension

When investigating incidental vocabulary learning and reading comprehension, the current literature mainly uses two types of protocols. Since the main line of investigation in these studies is vocabulary learning, reading comprehension assessment protocols are rather elementary: 1) the multiple choice (M/C), true and false (T/F) questions making data analysis easier for the researcher and easing some of the anxiety on study participants (e.g., Akbulut, 2007); 2) the use of total recall asking participants to

write down everything they remember about the target text (e.g., Jacobs, Dufon, & Hong, 1994); and 3) a simple list of questions about the target text in which participants are to respond with constructed responses (e.g., the typical way in which reading comprehension is assessed in higher proficiency language classrooms). It should be noted as with many assessment types, the protocol used depends on the goals of the researcher and or teacher and measures a different level of understanding. For example, a total recall requires the most effort from the participant to complete and would provide better evidence of what has been comprehended, whereas a M/C or T/F test essentially asks participants to identify what they comprehended (possibly even guess).

2.6 Increasing the Likelihood of Incidental Vocabulary Learning

Gass (1999) proposes some words may be more likely to be learned incidentally than others and this likelihood is based on a continuum (Figure 1). The likelihood of a word to be learned incidentally is based on the presence of three criteria: (a) there is a recognized cognate between the native and target languages; (b) there is a significant L2 exposure; or (c) other L2 related words are known. Therefore, on the opposite end of the continuum, the absence or lack of a strong presence of these criteria may reduce the likelihood of words to be learned incidentally.

In order to illustrate this concept, consider the following example: An English native speaker is reading a Spanish (his or her L2) text. The learner comes across a new word: *cuidar* (to take care of). Based on the continuum proposed by Gass, a prediction that this learner will be able to learn this word incidentally can be made because, (a) the word has a recognized cognate in English—to take care of, (b) the learner may have

heard the term *cuidar* many times, or (c) the learner knows an association of the word—the word in its imperative or command form *cuidate* (take care of yourself). However, a word such as *aunque* (even though/ although) may not lend itself so easily to learning incidentally because it does not share as many of the aforementioned characteristics.

Figure 1: Continuum of intentional and incidental vocabulary learning



Adapted from Gass (1999, p. 322)

2.7 The Provision of Additional Semantic Input When Reading for Comprehension

One area that has been the focus of much research has been the investigation of the effects of different types of the of semantic input on language learner vocabulary acquisition while participating in reading tasks (Akbulut, 2007; Al-Seghayer, 2001; Aust, Kelley, & Roby, 1993; Chun & Plass, 1996; Davis, 1989; Hulstijn, Hollander, & Greidanus, 1996; Jacobs, Dufon, & Hong, 1994; Knight, 1994; Kost, Foss, & Lenzini, 1999; Laufer & Hill, 2000; Lomicka, 1998; Luppescu & Day, 1993; Taylor, 2006). One of the abilities of the computer is that it is able, upon request, to provide additional semantic input enhanced input (Chapelle, 2003) while being engaged in reading activities. Chapelle defines enhanced input by the inclusion of elements that are salient, marked, or repetitious. She also points out that glosses can provide input modifications in the forms of images, L1 translations, L2 definitions, input simplification, or input elaboration. Furthermore, Davis (1989) notes that glossing offers two distinct

advantages: (1) glosses do not interrupt the reading process; and (2) readers can obtain as much or as little information as desired regarding a particular concept or word mentioned in the text being read.

2.7.1 Audio, Text, Video With Text, and Image Glosses

Researchers have investigated the use of multimedia electronic glosses and have seen the potential of enhanced input on developing lexical knowledge (Akbulut, 2007; Al-Seghayer, 2001; Chun & Plass, 1996; Laufer & Hill, 2000; Lomicka, 1998). Studies investigating multimedia glosses are usually conducted in a computer lab where participants have access to a specific program developed for the study. As the name implies, the glosses employ multimedia (images, textual glosses, and videos), which is typically not applicable to a paper based reading. The results and evidence provided in these studies are fascinating, positive, and support the idea that vocabulary knowledge can potentially be developed incidentally based on post-test scores and follow-ups.

Akbulut (2007) and Al-Seghayer (2001) found that participants were able to recall more words when provided with multimedia glosses, especially video. Al-Seghayer proposed that a video clip and text definition is more effective in teaching unknown vocabulary than a still picture with a text definition. Furthermore, he posited that video builds a better mental image, increases curiosity, which leads to increased concentration, and embodies a combination of vivid or dynamic images, sound and printed text. Chun & Plass (1996) found a connection between the performance of post-test vocabulary scores and reported retrieval cues for word recall was found. The authors stated these reported cues existed within the learner and corresponded to participant performance on

the vocabulary tests. However, contrary to the findings of Akbulut (2007) and Al-Seghayer (2001), the tendency was that for better recall was a result of words with picture and text glosses rather than with video and text annotations. They concluded that successful short-term recall and a possible abnormally strong recollection of the past effected the remembering of words with picture and text annotations. Furthermore, they consider this as a *dual coding* process allowing for better performance in on the recall tests due to learner ability to construct referential conditions between verbal and visual modes. In their study, Laufer and Hill (2000) found that words are remembered after they are looked up in an electronic dictionary and are remembered based on definition access frequency. Lomicka (1998) investigated the generation of online causal inferences, as revealed by the think-aloud data in her study, in order to determine whether multimedia annotations aided cognitive online comprehension of a text. Her results indicated that multimedia annotations might have had a positive effect on comprehension and the construction and integration of background and other world knowledge and a textbase. However, her data suggested that participants using the multimedia annotations primarily used them to construct a strong textbase and no apparent focus on learning the word occurred. In other words, the information in glosses had the ability to make cognitive connections within the participant, but often times, participants simply used glosses for a quick solution to a knowledge gap.

In sum, research indicates that multimedia glosses provide learners with potentially more engaging and interesting glosses than traditional text-only glosses. Furthermore, multimedia glosses provide input for visual learners in static image format as well as dynamic video. Evidence has also shown that gloss access frequency is

connected to word recall as well as the tendency of participants to access glosses when a lexical gap occurs.

2.7.2 L1 versus L2 Glosses

Studies have also been conducted investigating the impact L1 and L2 glosses have on incidental vocabulary learning of groups of participants (Jacobs et al., 1994; Taylor, 2006). Jacobs et al. (1994) found that glossing did not affect the overall recall of the fourth-semester Spanish L1 and L2 gloss groups; however, participants with higher than average language proficiency recalled more if they had read the glossed version of the text. Furthermore, the two gloss groups performed significantly better than the control group but on the delayed vocabulary test, there was no significant difference between any of the groups. Finally, the participants indicated almost unanimously their preference for marginal glosses over those placed in locations more distant from the text.

Taylor (2006) conducted a meta-analysis of the effects of CALL L1 glosses and traditional L1 glosses using effect size for his meta-analysis citing that it is a more effective measure of the effect of the degree of treatment on participants since some statistical tests are highly dependent on sample size and do not provide a standardized indication of treatment impact. His meta-analysis found that the effect of L1 glosses on L2 reading comprehension is more pronounced than previously thought. The overall effect size was of medium strength indicating that L2 readers who have L1 glosses perform on average over half a standard deviation (SD) higher than those who do not have access to such glosses. These results indicate that in general, learners provided with L1 glosses perform consistently better than those without such aids. Regarding treatment

type, Taylor concludes that the statistically different difference between the large effect size for CALL L1 outcomes and a small effect size of the traditional glossing group indicate that CALL L1 glosses have a much stronger effect on L2 reading comprehension than traditional glosses.

2.7.3 Dictionaries

Studies have also been conducted investigating the impact of the use of traditional paper dictionaries on incidental vocabulary when reading for comprehension (Hulstijn et al., 1996; Knight, 1994; Luppescu & Day, 1993). Some studies also compared the use of dictionaries and marginal glosses. Marginal glosses are either in the L1 or L2 of the participants and usually appear alongside of the text to be read. Hulstijn et al. (1996) found that glossed words appearing more than once were recognized more often and the provision of marginal glosses resulted in much better retention scores than the provision of dictionaries. Interestingly, participants in the dictionary group seldom used their dictionary, but when they looked up a word, their chance of remembering the meaning was greater than the average retention in the marginal gloss group. This finding may be attributed to the extra effort required by the participants to locate the word and the possibility that they were actually focusing on learning the meaning of the word; thus, if this were the case, the learning of these words would not be *incidental* as defined earlier.

Knight (1994) investigated the effect dictionary use had on words learned and if dictionary use helps some second-year Spanish students more than others (i.e., those of higher or lower verbal abilities). The results indicated that participants learned a significant number of new words while reading for meaning; however, high English

verbal ability participants learned more words than both low verbal ability participants and those who used a dictionary more frequently. Second, the dictionary condition increased the percentage of words learned by verbal ability group but it appeared that the lower verbal ability group had a special advantage because they learned as many words as the high verbal students in the same condition. Finally, the provision of dictionaries seemed to positively affect the reading comprehension of lower verbal ability participants. Luppescu and Day (1993) studied the contribution of bilingual paper dictionary use on vocabulary learning and the role bilingual dictionaries play in reading comprehension. The results indicated that overall, the use of a dictionary had a significant effect (over 50% better than the control group) on participant performance on the vocabulary and reading comprehension tests. Furthermore, the participants in the dictionary group took nearly twice as long to read the passage than the other group and participants who used dictionaries responded *I don't know* significantly less than did the students who did not use dictionaries.

2.7.4 Marginal Glosses

The effects of marginal glosses have also been studied on the performing of different tasks and the contribution marginal glosses make in different reading comprehension protocols finding that they help build better mental images and can be instrumental in reading comprehension. Kost et al. (1999) found that participants under both a textual gloss condition and a pictorial gloss condition performed equally on production tasks but participants with text and picture glosses performed significantly better on the picture recognition task. Additionally, results indicated that textual gloss

treatment provided better performance on the immediate word recognition task. The theoretical explanation for such results, the researchers argue, is that processing information requires different degrees of cognitive effort and that the two different representations of the text and picture combination glosses allow plotting of the picture into one mental model and thereby provide a "stronger bond" than the plotting of the words alone. Davis (1989) investigated different reading comprehension protocols (i.e., no aids, vocabulary/reading guide before reading, and a vocabulary/reading guide during reading—glosses). The results showed that participants in the vocabulary/guide before reading and the gloss groups recalled significantly more of the passage than those receiving no help and that glosses ensure more fluent reading of the text rather than distracting readers. Furthermore, Davis recommends the continued research and use of glosses in foreign-language texts read by intermediate-level students.

2.7.5 Paper Versus Computer

When comparing the use of hyper-reference dictionaries in comparison to conventional dictionaries and the effect these approaches have on reading comprehension, Aust et al. (1993) found that bilingual dictionary users consulted 25% more definitions than did monolingual dictionary users. Bilingual dictionary users completed reading the text in 20% less time than monolingual dictionary users. Efficiency was also higher during bilingual dictionary use than during monolingual dictionary use but the differences in comprehension were not significantly different. Additionally, the results indicated that readers consulted hyper-references more frequently than comparable paper references, because, according to the researchers,

hyper-references offer more efficient access and increase the learner's "appetite for elaboration."

2.8 Discussion

The synthesis of the current literature shows evidence that glossing difficult words and providing participants with sources of additional input when reading can lead to vocabulary recall and improve reading comprehension. Furthermore, there is evidence that hyper-media glosses increase reading fluency by required less reading time and allowing for a quick solution to a lexical gap. Finally, it appears that video and pictures are able to increase incidental learning and serve as recall cues. What also becomes apparent in the summation of the literature is that importance of learner training for CALL activities as well as other learning activities. Hubbard (2004) expresses the importance of learner training for CALL activities. To the CALL enthusiasts and practitioners, learner training is not seen as a novel concept and is a valid process. However, training learners on how to use software, or what Hubbard calls "training for specific applications" (p. 47) is not the only type of learner training that is beneficial to learners in reading activity contexts. Hubbard also calls for learner strategy training and training for learner autonomy. Training does not only apply to advanced technology research, Aust et al. (1993) had individual orientation sessions before treatment where participants completed a computer tutorial and were provided practice for the hyper-test version and given instructions on how to mark the words consulted in the paper dictionaries. Therefore, to increase the potential for incidental vocabulary learning to take place (based on the positive effects and procedures of previous studies), learners

should be taught vocabulary learning strategies as well as the technical aspects of accessing word meanings.

However, what does not appear much in the literature are studies comparing the outcomes of the more traditional approach of marginal L1 glosses to those of the application of CALL multimedia glosses. Therefore, it is an aim of the present study to investigate these differences. Additionally, a few studies mentioned in the synthesis investigated non-language influences on glossing studies (e.g., Jacobs et al., 1994; Knight, 1994). It has been long considered that certain factors such as extroversion, motivation, introversion, and proficiency may have influences on language learning (Gass & Selinker, 2001). It is therefore, an intention of the present study to investigate whether such characteristics influence the access frequency of glosses.

CHAPTER 3. METHODOLOGY

This chapter outlines the participants, materials, and method carried out for the present study. It begins by describing the participants for both the CALL group and Traditional group. This is followed by a description of the materials used for both groups, the procedures both groups went through during the study, and concludes with the proposed analysis and the identification of the variables to be used in addressing research questions presented in Chapter One.

3.1 Participants

A total of 36 participants were involved in the study. All of the participants in the present study were students of a two separate sections of Spanish 314 (high intermediate/low advanced learners) at an American university. The course is an introduction to Spanish literature course. All the students enrolled at the time of the study participated except for one student because of absence during the presentation introducing the study. Additionally, all the participants were either placed in the 300 level Spanish courses upon arrival to the university via placement tests, or the participants worked up to the 300 level after passing previous Spanish level courses (elementary and intermediate Spanish courses). Based on this achievement, the participants were assumed to be of the same general Spanish proficiency. The researcher allowed the professors to decide which section was assigned to the CALL group or the Traditional group. It was decided that the morning section of the class would be the CALL group because the professors thought that since the study location was across

campus, more participants would be likely to attend in the morning rather than the afternoon. Table 1 (overleaf) shows the demographic data of the participants in the two groups.

3.1.1 CALL Group

There were five males and 17 females making a total of 23 participants in the CALL group. The average age for the group was 21 (SD 4.1) and one student was a non-traditional student explaining the large SD. The native language of 20 of the participants was English and three participants stated they were either native speakers of Spanish or heritage learners; additionally, one participant stated that his native language was both English and Spanish. The average years of Spanish study for the group was 6.0 (SD 3.4). The participants stating heritage speakers, native speaker status, and both English and Spanish as a native language, were omitted from this calculation.

Table 1: Demographic data of the CALL group and Traditional group (means)

	CALL (n = 23)	Traditional (n = 13)
Age (mean)	21*	19.8
Years of Spanish study (mean)	6.0**	5.5
Males	5	6
Females	17	7
L1: Spanish	3***	2
L1: English	21***	11

Notes:

*One participant was a non-traditional student

** Three participants stated heritage speaker or native language as years of study and were omitted from these calculations

*** One participant stated both Spanish and English as L1

3.1.2 Traditional Group

There were six males and seven females for a total of 13 participants in the Traditional group. The average age for the group was 19.8 (SD 1.9). The native language of 11 of the participants was English and two participants claimed to be native speakers of Spanish. The average years of Spanish study for the group was 6.0 (SD 3.4).

3.2 Materials

3.2.1 Reading Passage

The text chosen for the present study originates from the medieval Spanish book *El Conde Lucanor* (*The Count Lucanor*) by Juan Manuel and is traditionally introduced in an introductory course of Spanish literature similar to the course the in which the participants of the present study were enrolled. The book consists of many chapters consisting of one short story in which the main character, El Conde Lucanor (Count Lucanor), asks his council, Patronio, to help him find a solution to a moral dilemma or a situation. Each story is very cyclical; that is, Count Lucanor tells Patronio of his current situation and then Count Lucanor asks Patronio for advice. Patronio offers advice to Count Lucanor in the form of a story with a moral lesson, which concludes with Patronio telling Count Lucanor explicitly what should be learned. This *mise en abyme*, or story within a story, can be very challenging for a reader and is the reason it is introduced at the 300 level of Spanish study (for a brief summary of the text, see Appendix A).

Since many versions of the book exist, including versions in the original medieval Castilian, a modern Castilian version of the story (Lacarra, 1986) was used. However, the text was not simplified beyond this modern version.

3.2.2 Target Words

The target words (TWs) for the current study were identified by two expert Spanish professors. One professor had research interest in medieval Spanish literature and the other was a Spanish professor and an applied linguist. Both had experience teaching introductory Spanish literature courses and were familiar with words that may be difficult for 300 level Spanish students when reading the text. Originally, the experts identified and agreed on a total of 43 words. The number of words identified exceeded the capabilities of the materials design for the traditional group (see section 3.2.4) so a list of 17 (see Table 2) words was created based on their absence in the corpus based Spanish dictionary: *A frequency dictionary of modern Spanish: Core vocabulary for learners* (Davies, 2006). Many of the words that were not in the dictionary had to do with the hierarchy of the Catholic Church, which plays a significant role in the story. Additionally, some of these words were cognates or partial cognates which may help the incidental learning of the words (Gass, 1999). It was decided by the researcher to gloss the first occurrence of each target word because some of the TWs appeared in the text more than others. Additionally, the glossing TWs more than once could potentially alter the results of the study because of additional exposure. There were a total of 13 nouns, one adjective, and three verbs.

Table 2: The 17 target words and their part of speech

Ahínco (noun)	Deanazgo (noun)	Obispado (noun)
Arzobispado (noun)	Escuderos (noun)	Papa (noun)
Arzobispo (noun)	Galardón (noun)	Perdices (noun)
Asar (verb)	Hereje (noun)	Recompensar* (verb)
Cardenal (noun)	Incumplido (adjective)	Redundar** (verb)
Deán (noun)	Obispo (noun)	

Notes:

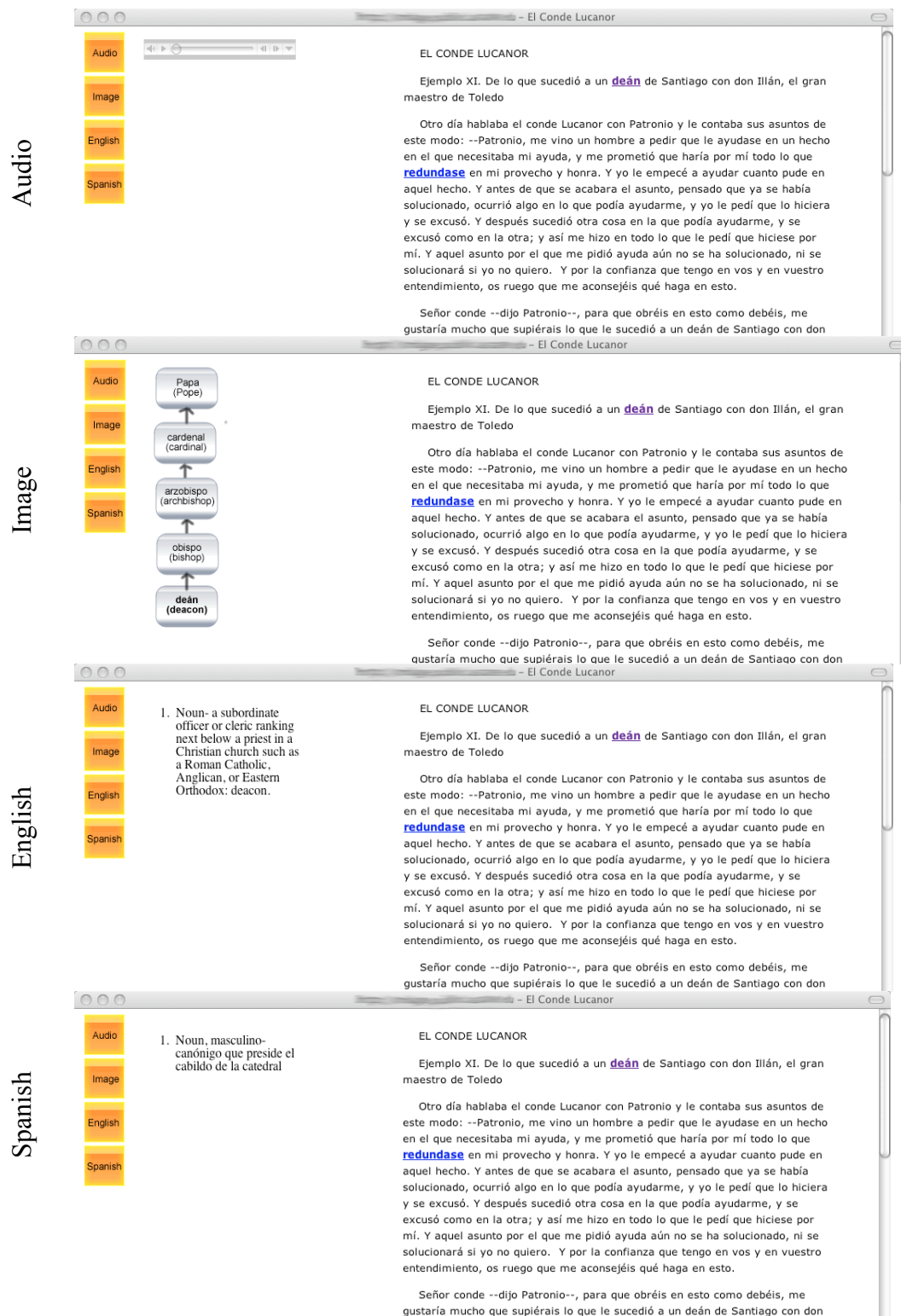
*Appeared as *recompensaba* (first or third person imperfect) in text

**Appeared as *redundase* (first or third person imperfect subjunctive II) in text

3.2.3 CALL Group Presentation of the Text

The CALL application was designed with the end-user in mind and was created using the HyperText Markup Language (html) authoring and editing software window. When accessed, the glosses would become available in the left frame. Four types of glosses were available to the participants: audio, image (association/mind maps), English definitions with direct word translations when available. The entire activity was set into a single frameset with the text located in the right frame of a 1024 pixels x 768 pixels and Spanish definitions (see Figure 2 overleaf). For optimal onscreen reading (Williams, 2004, 2006) black sans serif font (Verdana) on a white background was used. The linked TWs were underlined and blue in color. DeRidder (2002) found that underlining or providing links without underlining does not specifically influence clicking. Furthermore, it was decided to underline the links in order to convey that they were links and different than the rest of the text. Finally, the participant was able to scroll the text up and down while reading while the glosses remained at the top of the left frame facilitating gloss selection and viewing.

Figure 2: CALL text and gloss presentation



3.2.4 Traditional Group Presentation of the Text

The traditional format was designed to mimic the CALL application as closely as possible. The entire activity was set into a single table without borders. The text was located in the right column and the glosses were visible in the left column. The only glosses available to the participants in the traditional group were the English definitions with direct word translations when available (see Figure 3). Like the CALL application, black sans serif font (Verdana) on a white paper was used. The glossed TWs were underlined and blue in color.

Figure 3: Traditional text and gloss presentation

<p>Deán: Noun- a subordinate officer or cleric ranking next below a priest in a Christian church such as a Roman Catholic, Anglican, or Eastern Orthodox: deacon.</p> <p>Redundar: Verb- to have an effect for good or ill.</p>	<p>EL CONDE LUCANOR</p> <p>Ejemplo XI. De lo que sucedió a un <u>deán</u> de Santiago con don Illán, el gran maestro de Toledo</p> <p>Otro día hablaba el conde Lucanor con Patronio y le contaba sus asuntos de este modo: --Patronio, me vino un hombre a pedir que le ayudase en un hecho en el que necesitaba mi ayuda, y me prometió que haría por mí todo lo que <u>redundase</u> en mi provecho y honra. Y yo le empecé a ayudar cuanto pude en aquel hecho. Y antes de que se acabara el asunto, pensado que ya se había solucionado, ocurrió algo en lo que podía ayudarme, y yo le pedí que lo hiciera y se excusó. Y después sucedió otra cosa en la que podía ayudarme, y se excusó como en la otra; y así me hizo en todo lo que le pedí que hiciese por mí. Y aquel asunto por el que me pidió ayuda aún no se ha solucionado, ni se solucionará si yo no quiero. Y por la confianza que tengo en vos y en vuestro entendimiento, os ruego que me aconsejéis qué haga en esto.</p> <p>Señor conde --dijo Patronio--, para que obréis en esto como debéis, me gustaría mucho que <u>supiérais</u> lo que le sucedió a un deán de Santiago con don Illán, el gran maestro que vivía en</p>
---	--

3.2.5 Data Gathering Materials

3.2.5.1 Pre-test

The pre-test listed the 17 TWs in alphabetical order and asked the participants to respond with constructed responses (either a direct translation of the term or a written explanation or definition of the word) in English (see Appendix C). Since English was assumed to be the L1 of the majority of the participants, such measures are more likely to provide a better measure of actual recall than the cloze procedure or target language protocols (Davis, 1989). Furthermore, Lee (1986) found that comparable subjects can recall and produce significantly more when they write in their native language rather than write in the target language. The definite articles did not accompany the list of words on the pre-test.

3.2.5.2 Reading comprehension test

The reading comprehension exam consisted of 12 questions used by one of the Spanish experts when teaching the target text. The questions assessed how well the participants understood the text (see Appendix D).

3.2.5.3 Vocabulary post-tests

Similar to the vocabulary pre-test, participants were to complete constructed response vocabulary tests, testing the TWs (see Appendix E). Each term was listed in context with four words to the left, the target word, and then four words to the right (e.g., enviaba su tío el **arzobispo**, por la que le). This was done in order to provide some

context about the use of the word in the target text. The TWs were listed in the order in which they appeared in the text in pre-test one. In order to scramble the word order, the first seven words from the post-test one were moved to the end of post-test two, and the first 14 words from post-test one were moved to the end of post-test three. Like the pre-test, the participants responded in English.

3.2.5.4 Questionnaire

The questionnaire (see Appendix F) asked participants to indicate their native language, age, years of Spanish study, and sex. The questionnaire also asked the participants to rate their motivational level while studying Spanish, overall language proficiency in Spanish, overall introversion, overall extroversion, on a scale from one to five (one being the lowest and five the highest on the scale). Although this may not be the most reliable form of gathering this data, the time required to obtain this data is minimal and therefore was chosen because time was a limiting factor in the study. Finally, the questionnaire asked the participants to describe their use of the glosses, an explanation of why they used the glosses in this manner, what they would do to improve the activity, and what they liked about the activity.

3.3 Analysis of the CALL and Traditional Activity

Chapelle (2001) outlines a framework of recommended CALL evaluation principles in order to make judgments about particular CALL activities, software design, and learner performance during CALL activities. This analysis of CALL includes: *language learning potential, learner fit, meaning focus, authenticity, impact, and practicality*. Although the judgments proposed by Chapelle are geared towards the

evaluation of CALL materials, these judgments are also applicable to the traditional format. Therefore, these guidelines will be used to analyze both the CALL version and traditional versions of the activity.

3.3.1 Language learning potential

Each version of the activity uses available technology to enhance and possibly improve vocabulary learning. Chapelle (2003) addresses how the enhancement of input through salience, modification, and elaboration may be useful in language learning. Hubbard (2004) suggests that learners can benefit from training when introduced to new technologies with learning potential. This activity applies interactional modification not suggested by Chapelle (2003). This modification is accomplished thorough the provision of enhanced input (salience, modification, and elaboration) which enhance the Spanish vocabulary words leading to a possible enhanced language learning experience. Additionally learner training occurred twice in the study (see section 3.5.2.1). These provisions provide opportunities for users to “notice” and think about the words they have just read. It is hoped that by using these techniques cognitive processes will occur and allow opportunities for incidental vocabulary learning.

3.3.2 Learner fit

Learner fit encompasses individual learner linguistic ability differences as well as non-linguistic characteristics (Chapelle, 2001, p. 55). The CALL activity was designed with a specific audience and course in mind and provides the participants access to a text similar to one they would read during the course. Furthermore, since Spanish vocabulary

words were selected by two experts familiar with the abilities of typical 300 level Spanish students, in addition to being off list words from (Davies, 2006), learner fit appears to be appropriate.

3.3.3 Meaning focus

It is proposed by Chapelle (2001) that the defining feature of meaning focus is the requirement of learners to use target language to accomplish something. This can be a decision on an issue, an information exchange to accomplish a decision, or the exchange of information to accomplish a goal (p 56). Meaning focus is accomplished as the participant reads the text as well as accesses the glosses when reaching an unknown word. Furthermore, the participants were aware that a reading comprehension was to follow the activity so the participants were focused on understanding the meaning of the text.

3.3.4 Authenticity

Chapelle (2001, p. 88) states that an authentic activity corresponds highly with the likelihood of encountering the language used in the task outside the classroom. The text selection has already been established as being authentic in that the participants were to read it as a requirement for the course. Although the current study was not explicitly designed to develop language to be used outside the classroom beyond what vocabulary was learned, the study took place during the time the text was to be studied in the course; therefore, the participants encountered the text at the appropriate time of study.

3.3.5 Impact

The activity is seen to have a positive impact on the participants. Even though Chapelle (2001, p. 57) defines positive impact as the effects an activity has beyond its language learning potential, the activity does have a positive impact in the sense that the activity was designed to take place before classroom discussion of the selected text.

Therefore, by participating in the activity, each participant had read the text and had been provided with additional vocabulary input that he or she may have not been provided while reading the text in the assigned textbook. Furthermore, the professors may have used this activity as schema activation when discussing the text and as a supplement to additional readings from *El Conde Lucanor*.

3.3.6 Practicality

This activity is foreseen to be very practical. It fit easily into the predetermined curriculum of the courses in which the participants were enrolled. Additionally, the professors of the participants saw the potential and the usefulness of the activity while they were developing their syllabi for the semester of the study. The technical aspects of the activity are also practical. The activity has been designed to be viewable on computer screens with resolutions of 1024 pixels x 768 pixels and above. Doing this makes the activity viewable on laptop computers as well as desktops with monitors capable of handling higher resolutions. Furthermore, the simple design and its authoring in html allows it to be quickly altered to add additional glosses or an alternate text. The benefit of these design features and the relatively small file size of the activity allows it to be

stored on a CD-ROM and be used on any system with practically any operating system, an optical drive, and a web browser.

3.4 Procedure

The design of the present study was informed by the pilot study and the methodology of similar studies. The maximum time allowed for contact with the participants each day of the study was one class period (50 minutes); therefore, it was necessary to work within this time constraint on each day of the study. Furthermore, since the researcher was working with the professors of each group, it was imperative that the researcher acknowledged the research was being conducted during class time and that the research should not interfere with the schedules of the participants.

After IRB approval was attained and the participants read, understood, and signed the informed consent document (see Appendix B), the study began. The study was conducted at the same time in the course syllabus when each participant group was to read a similar text as the one used for the present study. Approximately one week before the study, the researcher visited each group at the end of class and presented the study. Each group was introduced to the study, told why the researcher was conducting the study, and presented with the study procedure (including the process of accessing the glosses). Finally, each participant was given the informed consent document for the study and asked to read it and sign the document. Since the study was integrated into the class syllabus and the participants were informed that their signature on the consent document allowed the researcher to use their data in the write up of the results of the study.

3.4.1 Day one

The first day of the study took place in the scheduled class meeting location for the Traditional group, and the CALL group met during 2 separate sessions in the TESL/AL computer lab of the English department of an American university. The computers in the lab ran the necessary software ("Camtasia Studio," 2005) for screen capturing. The software allowed participant interaction with the CALL software to be recorded and observed in a non-invasive manner. Two sessions were required due to technological constraints (only 15 computers with the necessary software were available). The screen resolutions was set to 1024 pixels x 768 pixels for optimal recording and interaction with the task and the CALL activity will be in queue when the participants arrive. The pre-test was given to the participants as they arrived at the study location. Each participant was asked to complete the pre-test to the best of their ability and to inform the researcher upon completion. Upon completion of the pre-test, the researcher told them that a tutorial video would follow shortly.

3.4.1.1 Learner training

Learner training of the application and highlighting procedure took place twice during the study. The first training took place during the introduction to the study and the second learner training session took place before each group begun the activity. For both sessions, the participants of the CALL group were shown how the features of the software (by clicking on a word in the text and then by clicking on the desired gloss) and the Traditional group was shown how to notate gloss access (using a highlighting pen to

indicate the lexical item, and frequency of gloss access) through a video projected upon a screen. Upon completion of the tutorial, the researcher asked if there were any questions.

3.4.1.2 CALL group

Upon completion of the tutorial video and answering questions, the participants were allowed begin the activity after the researcher and an assistant started the recording process. This was done in order to assure proper recording before the participants began the activity. Each participant was given 25 minutes to read the text with a reminder at 15 minutes that they would have 10 more minutes before it was necessary to being the next step (the reading comprehension post-test) in the study. The participants were allowed to begin the reading comprehension post-test before 25 minutes were up if they completed the reading before then. During the comprehension exam, the participants were allowed to use the text and access the glosses. Upon completion of the reading comprehension test, the participants were informed that they were done for the day and could go to their next class.

3.4.1.3 Traditional group

Upon completion of the tutorial video and answering questions, the participants were allowed begin the activity. Each participant was given 25 minutes to read the text with a reminder at 15 minutes that they would have 10 more minutes before it was necessary to being the next step (the reading comprehension post-test) in the study. The participants were allowed to begin the reading comprehension post-test before 25 minutes were up if they completed the reading before then. During the comprehension exam, the

participants were allowed to use the text and access the glosses. Upon completion of the reading comprehension test, the participants were informed that they were done for the day and could go to their next class.

3.4.2 Day two

The second day of the study took place the very next class meeting in the normal classrooms of each group. Respecting the time of the professors and the participants, the purpose of the second day of the study was to administer first vocabulary post-test and the questionnaire and took 15 minutes.

3.4.3 The following weeks

In the following two weeks, two additional vocabulary post-tests were administered allowing 15 minutes to complete the tests.

3.5 Compilation of Gloss Access Type and Frequency

Upon gathering all the raw data, several tasks needed to be completed in order to make the resulting data usable. First, the principle researcher watched the 23 screen captures of the interactions of the CALL group with the program making tallies of the gloss type and access frequencies of each of the participants. One independent individual watched three screen captures and was in accordance with the principle researcher in the frequency and type of glosses accessed. The same process was conducted for the traditional group, tallying the indicated gloss access frequencies.

3.6 Rating the Assessments

The principle investigator and two additional independent raters rated the pre-test and subsequent post-tests in addition to the reading comprehension test. The two additional raters were graduate students in the Applyed Linguistics program at the same university as the principle researcher. One rater was a doctoral candidate and the other was a master's candidate. The doctoral candidate was an American and a native speaker of English. The master's candidate was an English language learner from the Ukraine. Both raters had experience teaching languages. Keys (see Appendix G) were developed before rating by the principle researcher. The keys contained the English glosses given in the study. 68 points were possible for the vocabulary tests and 48 points were possible for the reading comprehension test. In addition to the provision of the keys, the principal investigator briefly described what each of the words meant. Raters were asked to rate the responses of the participants on a scale of one to four based on level of appropriateness (see Appendix H). Responses in Spanish or blank responses received a score of zero. In order for the additional raters to become familiar with the target text, a translation (Keller & Keating, 1977) was provided so the raters could be confident in their rating of the reading comprehension tests. Table 3 (overleaf) shows the coefficient alpha inter-rater reliability for each assessment. The inter-rater reliabilities are very high indicating that all three raters agreed on the levels of correctness of the participants in the four assessments.

Table 3: Inter-rater reliabilities among the three raters of the assessments

Assessment	Coefficient alpha
Pre-test	$\alpha = 0.99$
Post-test one	$\alpha = 0.97$
Post-test two	$\alpha = 0.99$
Post-test three	$\alpha = 0.96$
Reading comprehension	$\alpha = 0.98$

3.7 Analysis

Table 4 outlines the independent and dependent variables of the present study as well as the data gathered from the procedure addressing these variables. This data assisted in providing the answers to the research questions proposed in Chapter One.

Table 4: Identification of the independent and dependent variables, and data gathered from procedure

	Data gathering method	Data gathered
Independent variables	Vocabulary Pre-test total score	Prior total word knowledge
	Learner characteristics ratings	Self-rated level of introversion, extroversion, language proficiency, and motivation
	Use of glosses	Self-described use of glosses
	Explanation of gloss use	Self-described explanation of glosses use
	Gloss access type	Type of gloss accessed
	Gloss access frequency	Total glosses accessed
	Comprehension test total score	Overall text reading comprehension
Dependent variables	Vocabulary post-test total score	Overall word knowledge after treatment

3.7.1 Research question one

Question one (To what extent do Spanish students use glosses when reading Spanish literature in a CALL environment and traditional environment?) will be addressed by calculating descriptive statistics for the total number of glosses accessed by each participant in each group as well as the total number of each type of gloss accessed per CALL group participant. Attention will be drawn to any participants who did not use a gloss for a particular word.

3.7.2 Research question two

Question two (Which type of gloss presentation, traditional or CALL, facilitates reading comprehension the most?) will be answered through the use of descriptive statistics of the two groups based on gloss access behavior of the two groups and reading comprehension scores. These statistics will allow for the generalization that the group with a lower SD and high mean score was able to comprehend the text better. Therefore, holistically, whether the participants comprehended the text will be addressed by comparing these statistics between the two groups.

3.7.3 Research question three

Question three (To what extent do the type of gloss presentation, CALL or traditional have an affect on incidental vocabulary learning at post-test one? What is the effect over a period of three weeks?) will be addressed by presenting descriptive statistics and presenting the results of three paired sample t-tests accounting for the

differences in pre-test scores and post-test scores of the participants. The t-tests are recommended after personal communication with a statistics assistant at the university of the researcher. The first test compares the total scores of the pre-tests and first post-tests. The subsequent two tests each compare the total scores of the pre-tests and second post-tests and the total scores from the first post-tests and the third post-test for each group. The purpose of the tests is to identify any statistically significant differences between the two groups. Significant differences in any of the t-tests would indicate that one group was able to recall more words correctly than another and would warrant further investigation. No significant difference therefore, would indicate that there was no significant difference between the groups of the knowledge retained.

3.7.4 Research question four

Question four (Are lookup frequencies related to student reported introversion, extroversion, motivation, and language proficiency?) will be addressed by calculating a Spearman coefficient between participant look up frequencies of both groups combined and these self-reported criteria.

CHAPTER 4. RESULTS

This chapter addresses each of the research questions in turn and comment about how these results compare to past studies. The results indicate that participants improved in their ability to define previously unknown Spanish vocabulary words. Additionally, the participants indicated that they enjoyed the study and that they used the glosses to fill a lexical gap while reading.

4.1 Research Question One

Question one (To what extent do Spanish students use glosses when reading Spanish literature in a CALL environment and traditional environment?) is answered by the calculation of descriptive statistics for the total number of glosses accessed by each participant in each of the groups. These statistics can be seen in Table 5 (overleaf). The statistics indicate that both groups, on average, accessed the glosses the same number of times. However, the SD for each group indicates that there was a wide spread among the gloss access behaviors of the participants.

Of particular note is that out of the 23 total CALL group participants, 21 used more than one type of gloss. The remaining two participants focused solely on the English glosses. This shows that the majority of the participants were interested in the different characteristics of the CALL software and were willing to explore and investigate the different types of input the software provided while reading.

Table 5: Descriptive statistics of total gloss access by group

	Traditional group (n = 13)	CALL group (n = 23)
Mean	M = 19.69	M = 20.04
Standard Deviation	SD = 8.41	SD = 12.90

4.2 Research Question Two

Question two (Which type of gloss presentation, traditional or CALL, facilitates reading comprehension the most?) is answered through the use of descriptive statistics of the reading comprehension scores of the two groups. These statistics identify which group performed better on the reading comprehension test. The statistics indicate that the traditional group performed better. The SD of each group is very similar indicating that each group had a relatively equal spread of scores from the mean. Surprisingly, the mean scores for both of the groups (Traditional group M = 26.85; CALL group M = 20.04) are low, and as the percentages indicate, are not desirable outcomes for a comprehension test. These results may indicate that there was not enough time for the participants to read the text thoroughly or at a pace that was the most comfortable for them. Additionally, discussing or previewing a text before reading may have improved scores. This latter process is possibly the most important. These statistics are illustrated in Table 6.

Table 6: Descriptive statistics of reading comprehension scores by group

	Traditional group (n = 13)	CALL group (n = 23)
Mean	M = 26.85	M = 20.04
Standard Deviation	SD = 8.04	SD = 8.10
Average Percentage	55.94%	41.75%

4.3 Research Question Three

Question three (To what extent do the type of gloss presentation, CALL or traditional and frequency of gloss access have an affect on incidental vocabulary learning at post-test one? What is the effect over a period of three weeks?) is addressed in two ways. First, descriptive statistics show the trends the in pre-test scores and post-test scores of the performance of each group. Second, this question is addressed by conducting paired sample t-tests to investigate statistically significant differences in the scores of each group.

The descriptive statistics (Table 7 overleaf) indicate that over time, the mean vocabulary scores of two groups remained relatively. Additionally, the statistics show that scores increased from the initial pre-test meaning that students were able to provide the definitions for more words after completing the activity, and that learning took place. What also becomes apparent is that the Traditional group outperformed the CALL group.

Table 7: Descriptive statistics for vocabulary test scores by group

	Traditional group (n = 13)	CALL group (n = 23)
<i>Pre-test</i>		
Mean	M = 19.85	M = 18.74
Standard Deviation	SD = 8.07	SD = 13.29
<i>Post-test one</i>		
Mean	M = 46.46	M = 41.91
Standard Deviation	SD = 10.27	SD = 8.75
<i>Post-test two</i>		
Mean	M = 44.38	M = 38.65
Standard Deviation	SD = 15.86	SD = 14.65
<i>Post-test three</i>		
Mean	M = 46.85	M = 37.47
Standard Deviation	SD = 8.09	SD = 16.69

In order to investigate whether these results are statistically significant, and to account for the differences in the initial pre-test scores and post-test scores of participants, 3 paired sample t-tests were conducted. Essentially, what the t-tests investigated was the statistical significance of score improvement after treatment of both groups. Before running the tests, the difference between pre-test scores and the subsequent post-tests of each of the participants was calculated. This calculation accounts for any discrepancies between the initial pre-test scores of each of the participants and was used when running the tests. Figure 4 illustrates how this calculation was performed.

Figure 4 Illustration of t-tests conducted in answering research question three

$$\begin{aligned} &(\text{Trad Post 1} - \text{Trad Pre}) - (\text{CALL Post 1} - \text{CALL Pre}) \\ &(\text{Trad Post 1} - \text{Trad Pre}) - (\text{CALL Post 2} - \text{CALL Pre}) \\ &(\text{Trad Post 3} - \text{Trad Pre}) - (\text{CALL Post 3} - \text{CALL Pre}) \end{aligned}$$

The results of these tests are shown in Table 8 (overleaf) and indicate that no significant difference between the groups occurred after treatment. These calculations compare the total scores of the vocabulary tests for each group and pre-test scores. Significant p values would indicate that there are statistically significant differences between the scores of each group. However, since the p values of the tests are not significant, there does not seem to be a particular advantage of one type of gloss

presentation over another. The t-values are negative because of the greater mean scores of the traditional group on the tests.

Table 8: Results of the paired sample t-tests (significance level = .05)

Test	t (df)	p
Pre-test and post-test one	t (34) = - 0.78	p = 0.44
Pre-test and post-test two	t (34) = - 0.79	p = 0.43
Pre-test and post-test three	t (34) = - 1.70	p = 0.10

4.4 Research Question Four

Descriptive statistics combining the self-reported learner characteristics of the groups is shown in Table 9 (overleaf). Question four (Are lookup frequencies related to student reported introversion, extroversion, motivation, and language proficiency?) was addressed by calculating a Spearman coefficient between participant look up frequencies of both groups combined and these self-reported criteria. Spearman correlations do not assume a normal distribution of the data, but the relationship must be assumed to be linear and the variables need to constitute an ordinal scale (Bachman, 2004, p. 88). These assumptions were met and therefore, the calculations were conducted. The results of the correlations are seen in Table 10 (overleaf). The results indicate that a strong linear relationship does not exist for any of the non-language influences. However, there is a weak relationship between gloss access and student reported Spanish language proficiency. This relationship is positive and is statistically significant.

Table 9: Descriptive statistics for combined group learner characteristics

Learner Characteristic	Mean ρ	Standard Deviation
Proficiency	M = 3.36	SD = 0.64
Extroversion	M = 3.39	SD = 0.87
Introversion	M = 2.83	SD = 0.87
Motivation	M = 3.83	SD = 0.81

Table 10: Spearman correlations of non-language influences and access frequency

Learner Characteristic	Spearman ρ	p
Proficiency	0.37	0.03
Extroversion	- 0.03	0.87
Introversion	0.09	0.62
Motivation	0.15	0.38

4.5 Feedback from the Questionnaire

The feedback about the study was overwhelmingly positive, all the participants enjoyed the activity, and the CALL group particularly liked the various forms of glosses provided. Participants stated that the activity was not stressful, they were able to learn new vocabulary, and they had not previously read texts online and the CALL glosses were very interesting and having the definitions available in such a format saved time when reading. The overwhelming response in justifying their use of the glosses was to fill a lexical gap that the participants had while reading.

In order to improve the activity, the participants indicated that they would have liked to have more time to read the text and that more words should be glossed. Similarly, some participants stated that they felt rushed to finish reading the text. This feedback is seen as an indication that the participants were able to see the benefits of the

study and were able to find the glosses helpful. Two participants commented: “I liked the program, and felt it could be really helpful to learning Spanish” and “taking the vocabulary test now shows me I’ve at least recalled some of the vocabulary, and it’s always nice to have that occur on its own (without trying to memorize).”

4.6 Discussion

The results and answers to the research questions are interesting and surprising. As was indicated in Chapter Two, it was thought that the presentation of CALL glosses would provide an advantage in incidental vocabulary learning. However, it appears that there was no significant difference between the scores of the groups. Therefore, the benefit of one type of gloss presentation is inconclusive. The investigation into the non-linguistic features showed that learner proficiency was somewhat related to gloss access frequency. Further discussion of what may have lead to such results will be discussed in Chapter Five as well as suggestions for future research. Interestingly, participants with a higher level of proficiency made the most use of the glosses by accessing them more frequently. Although Jacobs et. al (1994) did not investigate the relationship between gloss access frequency and language proficiency, they did find that higher proficiency learners recalled more meanings of vocabulary words.

CHAPTER 5. SUMMARY AND DISCUSSION

The results from the study are inconclusive, but it is apparent that vocabulary learning took place and that based on total scores, this knowledge was maintained over a course of three weeks. Additionally, the participants overwhelmingly enjoyed both versions of the activity. This final chapter will discuss the limitations, pedagogical implications, and suggested areas of further research.

5.1 Limitations

There were several limitations in this study. However, the exploratory and investigative purpose of the study must be kept in mind. First of all, due to collaborating with two separate Spanish classes, there were an unequal number of participants in the two groups. However, it should be noted that although the class sizes were different, every student, with the exception of one, participated in the study and allowed for their data to be used.

Second, as reported in the exit survey by the participants, the study was limited in the amount of time provided for reading the target text and for completion of the study. The short time allotment may have unintentionally affected reading comprehension and could have lead to the low average scores on the reading comprehension tests. Additionally, a quick overview of the text and an explanation of the *mise en abyme* nature of the story may have been beneficial. When assessing the reading comprehension questions, it was apparent that the participants misunderstood or misread some of the questions. This may have been caused by the language used in the questions, or the

participants may have simply not had enough time to complete the questions or they rushed through them.

Third, the vocabulary post-tests may have benefited to a different approach in eliciting definitions. That is, the researcher could have created original sentences using the vocabulary words, or could have included the entire sentence from the text instead of the approach of four words to the left and four words to the right. The approach used did not provide as much context as anticipated and therefore, the approach should be revised when replicating the study.

Finally, the previous literature divided participants into gloss group types. This was not possible for the CALL group due to the design of the software as well as the research questions. When replicating this study this should be addressed. Especially since it was observed that many participants used the L1 gloss the most, similar to what Taylor (2006) found. It would also be interesting to compare different gloss formats (i.e., word association maps, L2, and L1) with CALL equivalents as well. This would be a step beyond the present study by providing more gloss options to the traditional group.

5.2 Pedagogical Implications

This version of the study showed that the traditional group, with a fewer number of participants had higher mean scores on the vocabulary tests. However, analysis found that there was no significant difference between the groups on the vocabulary tests meaning that one group did not perform significantly better than the other. What this means pedagogically is that when giving a reading assignment, instructors may need to provide more than a simple translation of a particular word, but alternatively provide a

more semantic type of gloss to increase the possibility of incidental learning. The provision of images, L1 and L2 definitions of words could greatly influence the possibility of words being learned and recalled when encountered again.

Furthermore, as Chapter Two indicated and as was carried out in the present study, learner training on how to use the glosses and their benefits is important. Additionally, the current study did not only focus on training the CALL group participants, but also the traditional group participants. For the current study, the researcher used a form of active reading (highlighting) to help provide data for the glossing behavior of the traditional group. Instructors therefore, can provide active reading strategies and techniques to help foster the lexical growth of his or her students. This type of learner training should increase learner awareness of the learning potential of the glosses as well as promote autonomous language learning. Therefore, when providing learners with glosses in the classroom, this is an important step and should not be overlooked.

Finally, if these types of strategies are followed, it must be stressed that although the results indicate that recall, in both groups, took place during the study, vocabulary learning must be reinforced and revisited throughout the language learning process. Reinforcement can be as simple as revisiting the words in different texts, or through the use of vocabulary games and other activities. It is only then after reinforcement and continued exposure that true vocabulary “learning” can be observed and the words can be integrated into the lexicon of the learner.

5.3 Further Research

Further research comparing traditional marginal glosses with CALL glosses needs to be conducted. The limitations and inconclusive results of the current study do not permit an indisputable argument on the effectiveness of either type of gloss method. Furthermore, the past research has been focused on different types of CALL glosses and combinations therein, the use of dictionaries while reading, marginal glosses, and the absence of such help. The results from the current study suggest that the retention of word meanings between the two conditions have the potential of benefiting the learner equally. It is proposed that a replication of the present study be conducted allowing access to all of the glosses and combinations of the glosses available to a number of groups but should still be compared to a group provided with traditional glosses. It may also be worthy of investigation to provide the traditional group with same images provided to the CALL group. With a larger and equal sample size, a replication of this study under the former conditions may provide very useful information and insight for the classroom and a more conclusive conclusion about that benefits and differences between the two conditions could be made.

Regarding the learner characteristics, it is recommended that other forms of obtaining this data be attempted (i.e., borrowing personality tests from psychology and other scientific fields). Gass & Selinker (2001, p. 353) state that one of the problems with self-reports is that participants may respond in a way that they deem the researcher wants them too. Therefore, a more scientific approach could be used that avoids this

possible outcome. Finally, a quick discussion about the target text, its organization, and the provision of more reading time should be included in the replication of this study.

In conclusion, as expressed by the participants of the present study, providing learners with glosses seems to be a worthwhile endeavor providing learners opportunities to become autonomous learners and develop reading strategies. Perhaps Martínez-Lage and Herren (1998, pp. 146-147) put it best: “technology-based annotated texts present us with new opportunities to assist our student in getting beyond the ‘mechanical’ aspects of the reading process and provide them with the means of developing good reading strategies.” Therefore, continuing this line of research seems a worthwhile process and may lead to a revelation in the applied linguistics field and more importantly, a better language learning experience for students.

APPENDIX A. BRIEF SUMMARY OF THE TARGET TEXT

The short story selected for the present study, *Ejemplo XI: De lo que sucedió a un deán de Santiago con don Illán, el gran maestro de Toledo* (Example XI: About what happened to a deacon of Santiago with Don Illán, the great master of Toledo) finds Count Lucanor in a situation where he has helped a friend accomplish a number of tasks in which the count asks his friend to assist him whenever it is needed. However, whenever Count Lucanor asks for assistance from his friend, the friend refuses to help. The count goes to Patronio and asks what he should do. Patronio tells a story of a deacon who is very interested in black magic and goes to visit Don Illán at his home. Don Illán is renowned in Spain for his knowledge of black magic. Don Illán agrees to teach the deacon black magic on the condition that the deacon promises to do whatever Don Illán asks of him. The deacon promises to do so and uses black magic to advance his position through the hierarchy of the Catholic Church. Every time the deacon makes advancement, Don Illán visits him and asks the deacon to give the position recently vacated by the deacon to his son or another family member. The deacon refuses each time telling Don Illán that he has given the position to one of his own friends. Seeing how the deacon refuses to keep his promise, Don Illán and the deacon find themselves back at the home of Don Illán at the time just before the deacon makes the promise.

APPENDIX B: INFORMED CONSENT DOCUMENT

INFORMED CONSENT DOCUMENT

Title of Study: An exploratory study of computer assisted language learning (CALL) glosses and traditional glosses in incidental Spanish vocabulary learning and their impact on reading comprehension.

Investigator: Thomas Michael Lage

This is a research study. Please take your time in deciding if you would like to participate. Please feel free to ask questions at any time.

INTRODUCTION

The purpose of this study is to explore the practicality of enhanced vocabulary information when engaged in an authentic Spanish reading task. It is hoped that the findings will provide insight and guidance into the development and implementation of similar tasks in foreign language learning. You are being invited to participate in this study because you are enrolled in Spanish 314 for which the task has been designed and in being so you will be able to benefit by participating.

DESCRIPTION OF PROCEDURES

This study has been integrated into the course syllabus, if you agree to participate in this study, your participation will last for three weeks and will involve meeting with the researcher once per a week. The first session will be the longest, no longer than one class period, and the remaining two sessions are not expected to last longer than 15 minutes.

During the first day of the study you may expect the following procedures to be followed: You will take a pre-test testing the target vocabulary for the study. Next, you will be asked to read an authentic Spanish literature text and consult enhanced vocabulary information when necessary. You will either be reading from a computer or from a paper booklet. Participants reading from a computer will have their interactions with the computer recorded using screen capturing software. Participants reading from the paper booklet will be asked to highlight their interactions with the text as instructed. You will then take a reading comprehension test, followed by another vocabulary test. Finally you will fill out a survey asking you to rate your language proficiency, indicate your years of Spanish study, age, sex, introversion/extroversion, impressions about the study, and your own ratings of your language learning style.

In the following two weeks, the researcher will come to class and ask you to complete two additional vocabulary tests (one test per week).

After the data has been gathered and compiled it will remain confidential and actual names will not be used to identify participants. Although responding to all survey and test items is strongly encouraged, you may skip any question that you do not wish to answer or that makes you feel uncomfortable.

RISKS

While participating in this study you will be exposed to no foreseeable risks.

BENEFITS

By participating in this study there is no direct benefit to you. It is hoped that the information gained in this study will benefit society by providing foreign language teachers and researchers with evidence for curriculum development and classroom implementation.

COSTS AND COMPENSATION

You will not have any costs from participating in this study. Beverages and snacks will be available for all participants as well as a raffle. A raffle will take place for gift certificates to Coldstone Creamery (\$20) and The Café (\$20). Every time a participant continues the study, his or her name will be added to the raffle increasing his or her odds at winning. Upon completion all of the study, winners will be contacted via email. Therefore, you will need to provide your name and email address in order for the researcher to get the raffle prizes to the winners.

PARTICIPANT RIGHTS

Although the study is being integrated into the course syllabus, if you decide to not participate in the study or leave the study early, it will not result in any penalty or loss of benefits to which you are otherwise entitled. You will need to participate in the components that are regular class assignments in order to receive credit as outlined in your syllabus, however, you can choose not to have those assignments included in this research if you wish.

CONFIDENTIALITY

Records identifying participants will be kept confidential to the extent permitted by applicable laws and regulations and will not be made publicly available. However, federal government regulatory agencies, auditing departments of Iowa State University, and the Institutional Review Board (a committee that reviews and approves human subject research studies) may inspect and/or copy your records for quality assurance and data analysis. These records may contain private information.

To ensure confidentiality to the extent permitted by law, the following measures will be taken: subjects will be assigned a unique code and letter and will be used on forms instead of their name after data collection. Identifiers will be kept with the data until the raffle is over. The researcher will keep the data in a locked filing cabinet, and in password protected computer files. The data will be kept until January 1, 2011 before erasure or destruction. If the results are published, your identity will remain confidential.

QUESTIONS OR PROBLEMS

You are encouraged to ask questions at any time during this study.

- For further information about the study contact Thomas Michael Lage: 319-360-2922 or tmlage@gmail.com. You may also contact Dr. Volker Hegelheimer: 515-294-2282 or volkerh@iastate.edu.
- If you have any questions about the rights of research subjects or research-related injury, please contact the IRB Administrator, (515) 294-4566, IRB@iastate.edu, or Director, (515) 294-3115, Office of Research Assurances, Iowa State University, Ames, Iowa 50011.

PARTICIPANT SIGNATURE

Your signature indicates that you voluntarily agree to participate in this study, that the study has been explained to you, that you have been given the time to read the document and that your questions have been satisfactorily answered. You will receive a copy of the written informed consent prior to your participation in the study.

Participant's Name (printed) _____

(Participant's Signature)

(Date)

If you are under 18 you need to have authorization from a Parent/Guardian or Legally Authorized Representative.

(Signature of Parent/Guardian or
Legally Authorized Representative)

(Date)

INVESTIGATOR STATEMENT

I certify that the participant has been given adequate time to read and learn about the study and all of their questions have been answered. It is my opinion that the participant understands the purpose, risks, benefits and the procedures that will be followed in this study and has voluntarily agreed to participate.

(Signature of Person Obtaining Informed Consent)

(Date)

APPENDIX C. PRE-TEST

Name: _____ Email: _____

Vocabulary Pre-Test

Give the meaning of the words in bold in **English**. Please **print** and write legibly. Also, keep your eyes to yourself and do not talk with anyone else. Answer as many as you can. If you would like the researcher to email your individual results of this test, upon completion of the study, please draw a **star** by your name.

1. **Ahínco**

2. **Arzobispado**

3. **Arzobispo**

4. **Asar**

5. **Cardenal**

6. **Deán**

7. **Deanazgo**

8. **Escuderos**

9. **Galardón**

10. **Hereje**

11. **Incumplido**

12. **Obispo**

13. **Obispado**

14. **Papa**

15. **Perdices**

16. **Recompensaba**

17. **Redundase**

APPENDIX D. READING COMPREHENSION TEST

Name: _____ Email: _____

Reading Comprehension Test

Answer the following questions in your own words and in **English**. Please **print** and write legibly. Also, keep your eyes to yourself and do not talk with anyone else. Please answer as many questions as you can in the time allotted. If you have difficulty remembering you MAY refer to the text (just remember to **indicate glosses used** while taking this test). If you would like the researcher to email your individual results of this test upon completion of the study, please draw a **star** by your name.

1. En sus propias palabras, ¿cuál es la historia que le cuenta el conde Lucanor a su consejero Patronio?

2. ¿Por qué se va el dean de Santiago a Toledo? ¿Cómo es recibido?

3. ¿Por qué sospecha don Illán de los hombres de gran posición?

4. ¿Qué es lo que le promete el dean a don Illán si le enseña la nigromancia (magia negra)?

5. ¿Qué es lo que le pide don Illán a su muchacha?

6. ¿A dónde llega la escalera de piedra?

7. ¿Quiénes interrumpen a los dos hombres?

-
-
-
8. Al verle a su amigo convertido en arzobispo, ¿qué le pide don Illán? ¿Cómo reacciona el nuevo arzobispo?

-
-
-
9. ¿Cómo reacciona el amigo a las otras peticiones de don Illán cuando es nombrado Obispo de Tolosa, cardenal, y finalmente Papa?

-
-
-
10. ¿De qué le acusa el Papa a don Illán?

-
-
-
11. Al pedir las perdices, ¿dónde se encuentran los dos hombres?

-
-
-
12. En sus propias palabras, ¿cuál es la moraleja de este cuento?

APPENDIX E. VOCABULARY POST-TESTS

Name: _____ Email: _____

Vocabulary Post-Test 1

Give the meaning of the words in bold in **English**. Please **print** and write legibly. Also, keep your eyes to yourself and do not talk with anyone else. Answer as many as you can. If you would like the researcher to email your individual results of this test, upon completion of the study, please draw a **star** by your name. After completing this test, you may continue to the survey.

1. lo que sucedió a un **deán** de Santiago con don Illán

2. mí todo lo que **redundase** en mi provecho y

3. le dijo que preparase **perdices** para cenar esta noche

4. no las pusiese a **asar** hasta que él se

5. enviaba su tío el **arzobispo**, por la que le

6. ocho días, llegaron dos **escuderos** muy bien vestidos y

7. por merced que el **deanazgo** que quedaba libre lo

8. un día mensajeros del **Papa** para el arzobispo con

9. que le daba el **obispado** de Tolosa y le

10. de poder dar el **arzobispado** a quien quisiese. Cuando

11. esto, reprochándole con mucho **ahínco** lo que con él

12. más adelante. Y el **obispo** le prometió forzosamente que

13. el Papa le hacía **cardenal** y le concedía la

14. tantas veces le había **incumplido** lo que había acordado

15. una cárcel, que era **hereje** y encantador, que bien

16. lo mal que le **recompensaba** el Papa lo que

17. os dé el mismo **galardón** que dio el deán

Vocabulary Post-Test 2

1. un día mensajeros del **Papa** para el arzobispo con

2. que le daba el **obispado** de Tolosa y le

3. de poder dar el **arzobispado** a quien quisiese. Cuando

4. esto, reprochándole con mucho **ahínco** lo que con él

5. más adelante. Y el **obispo** le prometió forzosamente que

6. el Papa le hacía **cardenal** y le concedía la

7. tantas veces le había **incumplido** lo que había acordado

8. una cárcel, que era **hereje** y encantador, que bien

9. lo mal que le **recompensaba** el Papa lo que

10. os dé el mismo **galardón** que dio el deán

11. lo que sucedió a un **deán** de Santiago con don Illán

12. mí todo lo que **redundase** en mi provecho y

13. le dijo que preparase **perdices** para cenar esta noche

14. no las pusiese a **asar** hasta que él se

15. enviaba su tío el **arzobispo**, por la que le

16. ocho días, llegaron dos **escuderos** muy bien vestidos y

17. por merced que el **deanazgo** que quedaba libre lo

Vocabulary Post-Test 3

1. tantas veces le había **incumplido** lo que había acordado

2. una cárcel, que era **hereje** y encantador, que bien

3. lo mal que le **recompensaba** el Papa lo que

4. os dé el mismo **galardón** que dio el deán

5. lo que sucedió a un **deán** de Santiago con don Illán

6. mí todo lo que **redundase** en mi provecho y

7. le dijo que preparase **perdices** para cenar esta noche

8. no las pusiese a **asar** hasta que él se

9. enviaba su tío el **arzobispo**, por la que le

10. ocho días, llegaron dos **escuderos** muy bien vestidos y

11. por merced que el **deanazgo** que quedaba libre lo

12. un día mensajeros del **Papa** para el arzobispo con

13. que le daba el **obispado** de Tolosa y le

14. de poder dar el **arzobispado** a quien quisiese. Cuando

15. esto, reprochándole con mucho **ahínco** lo que con él

16. más adelante. Y el **obispo** le prometió forzosamente que

17. el Papa le hacía **cardenal** y le concedía la

APPENDIX F. QUESTIONNAIRE

Name: _____ **Email:** _____

Questionnaire

Please answer *ALL* of the following questions. Your responses and insight will be used for further development of the project.

1. What is your native language? _____

2. How old are you? _____

3. How many years have you studied Spanish? _____

4. Are you a (circle one): Male Female

5. Circle the number below that best describes your *motivational level* when studying Spanish (one being the lowest five being the highest)

1 2 3 4 5

6. Circle the number below that best describes your *overall language proficiency* in Spanish (one being the lowest five being the highest)

1 2 3 4 5

7. Circle the number below that best describes your *overall introversion* (one being the lowest five being the highest)

1 2 3 4 5

8. Circle the number below that best describes your *overall extroversion* (one being the lowest five being the highest)

1 2 3 4 5

9. Use the space below to describe your use of the glosses provided in this activity? PLEASE PRINT

10. Why do you think you used the glosses in this manner? PLEASE PRINT

11. What is one thing you would do to improve this activity? PLEASE PRINT

12. What is one thing that you liked about this activity? PLEASE PRINT

APPENDIX G. KEYS

Vocabulary KEY

Deán: a subordinate officer or cleric ranking next below a priest in a Christian church such as a Roman Catholic, Anglican, or Eastern Orthodox: deacon.

Redundar: to have an effect for good or ill.

Perdices: any of various typically medium-sized stout-bodied Old World gallinaceous game birds with variegated plumage: partridge.

Asar: to cook by exposing to dry heat (as in an oven or before a fire) or by surrounding with hot embers, sand, or stones: to roast.

Arzobispo: a bishop at the head of an ecclesiastical province or one of equivalent honorary rank: archbishop.

Escuderos: shield bearers, knight's squires.

Deanazgo: pertaining to the church duties of the deacon.

Papa: a prelate who as bishop of Rome is the head of the Roman Catholic Church: Pope.

Obispado: territory or district of a bishop which he exercises his duties and jurisdiction.

Arzobispado: to see or province over which an archbishop exercises authority.

Ahínco: determination characterized by or proceeding from an intense or serious state of mind.

Obispo: religious figure who has spiritual or ecclesiastical supervision ranking above priest, having authority to ordain and confirm, and typically governing a diocese: bishop

Cardenal: in the Roman Catholic Church, one of the group of clergy, next in rank to the pope, who elect the Pope from their own number and act as his advisers: cardinal

Incumplido: to unfulfill a promise.

Hereje: a person who denies the established dogmas of a religion: heretic

Recompensar: to give something by way of compensation (as for a service rendered or damage incurred).

Galardón: reward or prize received after some job or service.

Reading Comprehension Test KEY

1. En sus propias palabras, ¿cuál es la historia que le cuenta el conde Lucanor a su consejero Patronio? [In your own words, what is the theme of the story that Count Lucanor tells his council Patronio?]

A man came to ask for the Conde's help promising that he would return the favor by helping him with something. However, when the Conde needed help, the man never made good on his promise to help.

2. ¿Por qué se va el deán de Santiago a Toledo? ¿Cómo es recibido?

[Why does the Deacon of go to Toledo? How is he welcomed?]

The deán wanted to learn "the dark arts/black magic" and don Illán was the best at such arts.

3. ¿Por qué sospecha don Illán de los hombres de gran posición? [Why was Don Illán suspicious of men in good positions?]

Men of high status can achieve much very quickly, but can also quickly forget the means and how they achieve so much.

4. ¿Qué es lo que le promete el deán a don Illán si le enseña la nigromancia (magia negra)? [What does the deacon promise Don Illán if he teaches him black magic?]

The deán promises and assures don Illán that he will remember what don Illán did for him, and do whatever don Illán asks of him.

5. ¿Qué es lo que le pide don Illán a su muchacha? [What is it that Don Illán asks his housemaid?]

He asks her to prepare some partridges for dinner

6. ¿A dónde llega la escalera de piedra? [To where do the stone steps lead?]

Deep into the earth to a room with many books.

7. ¿Quiénes interrumpen a los dos hombres? [Who interrupts the two men?]

Men and/or squires carrying letters containing various news.

8. Al verle a su amigo convertido en arzobispo, ¿qué le pide don Illán? ¿Cómo reacciona el nuevo arzobispo? [Upon seeing his friend elected,

archbishop, what does Don Illán ask him? How does the new archbishop react?]

Don Illán asks that the newly opened position to his son, but the deán refused to do so, giving the open position to a friend/relative.

9. ¿Cómo reacciona el amigo a las otras peticiones de don Illán cuando es nombrado Obispo de Tolosa, cardenal, y finalmente Papa? [How does the deacon react to the other petitions of don Illán when the deacon is named bishop, cardinal, and Pope?]

In the same manner. The deán did not fulfill his promise.

10. ¿De qué le acusa el Papa a don Illán? [What does the Pope accuse Don Illán of?]

Of being a heretic and a sorcerer

11. Al pedir las perdices, ¿dónde se encuentran los dos hombres? [Upon asking about the partridges, where do the men find themselves?]

The deán was the same as he was in the beginning of the story and they were, and they were to dine on the partridges that were to be prepared earlier.

12. En sus propias palabras, ¿cuál es la moraleja de este cuento? [In your own words, what is the moral of this story?]

If you promise to do something after receiving help, and good comes to you from the help you receive, you need to make sure that you fulfill your promise.

APPENDIX H. RATING SCALES

Vocabulary Ratings

Group:	Test:
Participant ID:	Rater:

1= not relevant to the meaning of the word at all

2= to some extent related to the meaning of the word

3= very close to the meaning of the word but not accurate

4= accurate

Item 1	blank	1	2	3	4
Item 2	blank	1	2	3	4
Item 3	blank	1	2	3	4
Item 4	blank	1	2	3	4
Item 5	blank	1	2	3	4
Item 6	blank	1	2	3	4
Item 7	blank	1	2	3	4
Item 8	blank	1	2	3	4
Item 9	blank	1	2	3	4
Item 10	blank	1	2	3	4
Item 11	blank	1	2	3	4
Item 12	blank	1	2	3	4
Item 13	blank	1	2	3	4
Item 14	blank	1	2	3	4
Item 15	blank	1	2	3	4
Item 16	blank	1	2	3	4
Item 17	blank	1	2	3	4

Reading Comprehension

Group:	
Participant ID:	Rater:

1= not a relevant response to question at all

2= to some extent an appropriate response to the question

3= accurate response to the question

Item 1	blank	1	2	3
Item 2	blank	1	2	3
Item 3	blank	1	2	3
Item 4	blank	1	2	3
Item 5	blank	1	2	3
Item 6	blank	1	2	3
Item 7	blank	1	2	3
Item 8	blank	1	2	3
Item 9	blank	1	2	3
Item 10	blank	1	2	3
Item 11	blank	1	2	3
Item 12	blank	1	2	3

REFERENCES

- Akbulut, Y. (2007). Effects of multimedia annotations on incidental vocabulary learning and reading comprehension of advanced learners of English as a foreign language. *Instructional Science*, 35(6), 499-517.
- Al-Seghayer, K. (2001). The effect of multimedia annotation modes on L2 vocabulary acquisition: A comparative study [Electronic Version]. *Language Learning & Technology*, 5, 202-232. Retrieved April 13, 2007, from <http://llt.msu.edu/vol5num1/alsegghayer/default.html>
- Aust, R., Kelley, M. J., & Roby, W. B. (1993). The use of hyper-reference and conventional dictionaries. *Educational Technology Research and Development*, 41, 63-73.
- Bachman, L. F. (2004). *Statistical analysis for language assessment*. New York: Cambridge University Press.
- Bax, S. (2003). CALL--past, present and future. *System*, 31, 13-28.
- Belz, J. A. (2004). Learner corpus analysis and the development of foreign language proficiency. *System*, 32, 577-591.
- Bernhardt, E. B. (1991). The nature of second language reading. In *Reading development in a second language: Theoretical, empirical, and classroom perspectives* (pp. 1-17). Norwood, NJ: Ablex Publishing.
- Braine, G. (2004). Teaching second and foreign language writing on lans. In S. Fotos & C. Brown (Eds.), *New perspectives on CALL for second language classrooms*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Camtasia Studio (Version 3.0.0). (2005). Okemos, Michigan: TechSmith.
- Chandler, P., & Sweller, J. (1991). Cognitive load theory and the format of instruction. *Cognition and instruction*, 8, 293-332.
- Chapelle, C. A. (2001). *Computer applications in second language acquisition*. New York: Cambridge University Press.
- Chapelle, C. A. (2003). The potential of technology for language learning. In *English language learning and technology* (pp. 35-68). Philadelphia: John Benjamins Publishing.
- Chun, D. M., & Plass, J. L. (1996). Effects of multimedia annotations on vocabulary acquisition. *The Modern Language Journal*, 80(ii), 183-198.
- Davies, M. (2006). *A frequency dictionary of modern Spanish: Core vocabulary for learners*. New York: Routledge.
- Davis, J. N. (1989). Facilitating effects of marginal glosses on foreign language reading. *The Modern Language Journal*, 73(1), 41-48.
- De la Fuente, M. J. (2003). Is SLA interactionist theory relevant to CALL? A study on the effects of computer-mediated interaction in L2 vocabulary acquisition. *Computer Assisted Language Learning*, 16(1), 47-81.
- De Ridder, I. (2002). Visible or invisible links: Does the highlighting of hyperlinks affect incidental vocabulary learning, text comprehension, and the reading process? [Electronic Version]. *Language Learning & Technology*, 6, 123-146. Retrieved April 13, 2007,
- Eskey, D. E. (1988). Holding in the bottom. In P. L. Carrell, J. Devine & D. E. Eskey (Eds.), *Interactive approaches to second language reading* (pp. 93-100). New York: Cambridge University Press.

- Gass, S. (1999). Discussion: Incidental vocabulary learning. *Studies in Second Language Acquisition*, 21, 319-333.
- Gass, S., & Selinker, L. (2001). Non-language influences. In *Second language acquisition*. Mahwah, New Jersey.
- Hubbard, P. (2004). Learner training for effective use of CALL. In S. Fotos & C. M. Browne (Eds.), *New perspectives on CALL for second language classrooms* (pp. 45-67). Mahwah, New Jersey: Lawrence Erlbaum Associates.
- Huckin, T., & Coady, J. (1999). Incidental vocabulary acquisition in a second language: A review. *Studies in Second Language Acquisition*, 21(2), 181-193.
- Hulstijn, J. H., Hollander, M., & Greidanus, T. (1996). Incidental vocabulary learning by advanced foreign language students: The influence of marginal glosses, dictionary use, and reoccurrence of unknown words. *The Modern Language Journal*, 80, 327-339.
- Jacobs, G., Dufon, P., & Hong, F. C. (1994). L1 and L2 glosses in reading passages: Their effectiveness for increasing comprehension and vocabulary knowledge. *Journal of Research in Reading*, 17(1), 19-28.
- Keller, J. E., & Keating, L. C. (1977). What happened to a dean of Santiago and Don Yllán, the grand master of Toledo. In *The book of count lucanor and patronio: A translation of Don Juan Manuel's el conde lucanor* (pp. 67-71).
- Knight, S. (1994). Dictionary use while reading: The effects on comprehension and vocabulary acquisition for students of different verbal abilities. *The Modern Language Journal*, 78(iii), 285-298.
- Kost, C., Foss, P., & Lenzini, J. (1999). Textual and pictorial gloss: Effectiveness on incidental vocabulary growth when reading in a foreign language. *Foreign Language Annals*, 32(1), 89-113.
- Krashen, S. D. (1982). *Principles and practice in second language learning*. New York: Pergamon.
- Lacarra, M. J. (1986). El deán de Santiago y don illán. In *Odres nuevos: Cuentos de la edad media* (pp. 159-164). Madrid: Editorial Castalia.
- Lam, W. S. E. (2000). L2 literacy and the design of the self: A case study of a teenager writing on the internet. *TESOL Quarterly*, 34(3), 457-482.
- Laufer, B., & Hill, M. (2000). What lexical information do L2 learners select in a CALL dictionary and how does it affect word retention? *Language Learning & Technology*, 3(2), 58-76.
- Laufer, B., & Hulstijn, J. (2001). Incidental vocabulary acquisition in a second language: The construct of task-induced involvement. *Applied Linguistics*, 22, 1-26.
- Lee, J. F. (1986). On the use of the recall task to measure L2 reading comprehension. *Studies in Second Language Acquisition*, 8, 201-212.
- Levy, M. (1997). *Computer-assisted language learning: Context and conceptualization*. Oxford: Oxford University Press.
- Lomicka, L. L. (1998). To gloss or not to gloss: An investigation of reading comprehension online [Electronic Version]. *Language Learning & Technology*, 1, 41-53. Retrieved April 15, 2007, from <http://llt.msu.edu/vol1num2/pdf/article2.pdf>.
- Luppesku, S., & Day, R. (1993). Reading, dictionaries, and vocabulary learning. *Language Learning*, 43(2), 263-287.
- Martínez-Lage, A., & Herren, D. (1998). Challenges and opportunities: Curriculum pressures in the technological present. In J. Harper, M. Lively & M. Williams (Eds.), *Technology enhanced language learning* (pp. 141-167). Boston: Heinle & Heinle.
- Mayer, R. E. (1997). Multimedia learning: Are we asking the right questions? *Educational Psychologist*, 32(1), 1-19.

- Muyskens, J. (Ed.). (1997). *New ways of learning and teaching: Focus on technology and foreign language education*. Boston: Heinle & Heinle.
- Myers, J. L. (1990). Causal relatedness and text comprehension. In D. A. Balota, G. F. d'Arcais & K. Rayner (Eds.), *Comprehension processes in reading* (pp. 361-375). Hillsdale, NJ: Erlbaum.
- Nation, I. S. P. (2001). *Learning vocabulary in another language*. New York: Cambridge University Press.
- Paivio, A. (1986). *Mental representations: A dual coding approach*. New York: Oxford University Press.
- Pennington, M. (1996). The power of the computer in language education. In M. Pennington (Ed.), *The power of CALL* (pp. 1-14). Houston, TX: Athelstan.
- Schmidt, R. W. (1990). The role of consciousness in second language learning. *Applied Linguistics*, 11(2), 129-158.
- Schmidt, R. W. (1993). Awareness and second language acquisition. *Annual Review of Applied Linguistics*, 13, 206-226.
- Taylor, A. (2006). The effects of CALL versus traditional L1 glosses on L2 reading comprehension. *CALICO Journal*, 23(2), 309-318.
- Trabasso, T., & Magliano, J. (1996). Conscious understanding during comprehension. *Discourse Processes*, 21(3), 255-287.
- Trabasso, T., & Suh, S. (1993). Understanding text: Achieving explanatory coherence thorough online inferences and mental operations in working memory. *Discourse Processes*, 16(1-2), 3-34.
- Warschauer, M. (1996). Computer-assisted language learning: An introduction. In S. Fotos (Ed.), *Multimedia language teaching* (pp. 3-20). Tokyo: Logos International.
- Warschauer, M., & Healey, D. (1998). Computers and language learning: An overview. *Language Teaching*, 31, 57-71.
- Whitney, P., & Budd, D. (1996). Think-aloud protocols and the study of comprehension. *Discourse Processes*, 21(3), 341-351.
- Whitney, P., Ritchie, B., & Clark, M. (1991). Working memory capacity and the use of elaborative inferences in text comprehension. *Discourse Processes*, 14(2), 133-145.
- Williams, R. (2004). *The non-designers design book*. Berkeley, California: Peach Pit.
- Williams, R. (2006). *The non-designer's type book*. Berkeley, California: Peach Pit.

ACKNOWLEDGEMENTS

I would like to take this opportunity to thank those who have guided me and supported me throughout my academic life, and will continue to do so.

To Mr. David Schmidt: You may be unaware of this fact, but you are my greatest inspiration in becoming a language teacher. Never forget the impact you have on your students and the lives that you touch. Thank you.

To my thesis committee: Thank you very much for your flexibility, guidance, and suggestions during my thesis writing process. Without your contributions and knowledge, I would not have been able to complete my thesis work and learned so much along the way. I am extremely honored and privileged to have been able to work with each of you. You have allowed me to accomplish very much. Thank you.

Mr. Richard Bartosh: You have been and will continue to be my first and greatest mentor. Being able to consult with you and share ideas and time with you while at Iowa State made my education and college experience much more enjoyable and enlightening. Thank you so very much for taking such good care of me.

To my sister, Abigail Leland: You have always been my best friend and have always been by my side when I have needed you. Thank you for your advice and help throughout my life and my college career. Without you, I would have been lost.

Finally, to my parents, Mary Rose and Thomas Donald Lage: Without your guidance, support, and modeling in my life, I would have not been able to achieve my goals both academically and personally. Your support and sacrifices have left a profound impact on my life and will never be forgotten. I love you both very much.